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5 This invention relates to RF identification
devices and, more particularly, to RF identification devices
designed to permit the transmission of information about a
person or thing to whom or which the RF identification
devices are secured. The RF identification devices of the
10 invention have particular application in the identification
of individuals and the transmission of relevant information
about said individuals to a master receiving and transmit-
ting station whereby, when said master station addresses the
RF identification devices on particular individuals, it will
15 be able to ascertain various aspects of relevant data perti-
nent to the condition, situation, or other pertinent
information about the individual.

Of course, a hand-held reader capable of receiving information from the identification device and, in certain instances, of transmitting information to the memory of the identification device for storage therein, can be used in substitution for the master station referred to hereinabove.

25 At the present time, identification devices such
as wristbands or the like are widely used in hospitals to
identify patients and to provide information regarding the

patients. Such wristbands are also utilized in various other applications, including prisoner identification and crowd control. Initially, such wristbands were confined to providing the bare minimum of the patient's name and, possibly, the nature of the patient's illness. Recently, such wristbands have been provided with encoded information in the form of bar codes or the like whereby considerable additional information about the patient can be ascertained, including such relevant data as medication, the patient's condition, or the like.

In utilizing such wristbands, bar code readers are provided to the nursing or other staff members and the nurse or other staff member reads the bar code before administering medication or performing various therapeutic measures.

While the use of bar codes or other encoded materials has constituted a considerable advance, once the bar code has been applied to the identification wristband, the alteration of the information on the wristband entails the substitution of a new wristband. In addition, because of physical limitations, the information imparted by bar codes or the like is necessarily limited.

A possible solution which would overcome the limitations of identification wristbands which are bar-coded or the like would be to provide an RF circuit in the wristband which would incorporate a semi-conductor circuit with logic, memory, and an RF circuit connected to an antenna capable of receiving and transmitting information so that a nurse or

other staff member carrying a transponder could query the RF circuit of the wristband to elicit a wide spectrum of information not presently available in conventional wristbands.

5 Unfortunately, available RF circuits are relatively expensive and, since conventional wristbands are disposable after use, such circuits would have to be discarded if they were integral components of the wristband.

10 Objects and Advantages of the Invention

 An object of the invention is the provision of an RF identification device which includes attachment means for attaching the RF identification device on a person or object to be identified and securement means for said attachment
15 means whereby said attachment is retained in operative relationship with said person or object. For instance, the attachment means for hospital patient use can be in the form of a wristband and the wristband can be maintained in operative relationship with the wrist of the patient by
20 securement means which holds the wristband on the patient's wrist, ankle or the like.

 The RF circuit is located in the securement means and, when the wristband is discarded, the securement means can be sterilized and reused, thus permitting the reuse of
25 the RF circuit with the consequent economies resulting from such reuse.

Another object of the invention is the provision of an RF identification device of the aforementioned character wherein said attachment means incorporates an antenna and said securement means incorporates a transponder
5 operatively connected to said antenna for receiving and transmitting information relating to the person or thing on which said attachment means is retained by said securement means.

A further object of the invention is the provision
10 of an RF identification device in which said attachment means is constituted by the strap of an identification wristband and said securement means maintains said strap in operative relationship with a person or object to be identified.

15 Another object of the invention is the provision of an identification wristband incorporating an RF identification device, said wristband having an attachment portion constituted by an elongated strap and a securement means for maintaining said attachment portion in operative
20 relationship with an object or person to be identified, said strap incorporating an antenna and said securement means incorporating a transponder operatively connected to said antenna whereby said wristband can receive and transmit signals imparting information regarding said person or
25 object.

A further object of the invention is the provision of a wristband of the aforementioned character wherein said

Preferred Embodiments of the Invention

Referring to the drawings, and particularly to Figs. 1-2 thereof, I show a portion of an identification
5 wristband 10 which includes an attachment means 12 and a
securement means 14. The securement means 14 is demountably
secured to the attachment means 12 by a boss 16. The boss
16 has a slightly enlarged upper extremity which is larger
than the mating opening 17 provided in the adjacent
10 extremity of the wristband 10.

Therefore, the opening 17 in the wristband 10 can
be forced over the slightly enlarged extremity of the boss
16 to hold the wristband in operative relationship with the
securement means 14. However, when the use of the wristband
15 by a patient or other person is finished, the wristband can
be removed from operative relationship with the boss 16 by
prying the extremity of the wristband 10 from operative
engagement with the boss 16.

The attachment means is constituted by the strap
20 or body portion 18 of the wristband 10, said body portion
incorporating a space 22 between two laminae 24 and 26.

The structure and operation of the wristband 10
are more fully described in U.S. Letters Patent No.
5,479,797, the present description being limited to the
25 incorporation in the securement means 14 of an RF circuit 30
shown in phantom in Figs. 1 and 2 of the drawings. The
securement means is fabricated by any suitable process from

synthetic plastic material. For instance, high-density polyethylene can be used to fabricate the securement means 14 by the injection molding process with the boss 16 formed as an integral component thereof. During the injection molding process an IC chip 30 or RFID module is molded into the securement means 14.

Alternatively, a receptacle can be formed in the securement means 14 and the IC chip 30 or RFID module can be located in the receptacle for reuse in conjunction with the securement means 14.

Formed in the space 22 between the laminae 24 and 26, is an antenna 33 which can be electrically connected to the IC chip 30 by conductive bosses 32 engaging corresponding conductors, not shown, on the antenna 33. The antenna 33 can be fabricated in conjunction with the fabrication of the wristband 10 by various methods including foil strips, the use of conductive inks or conductive wires. The showing in Fig. 1 is not intended to indicate the requisite length of the antenna 33 since this is determined by the characteristics of the IC chip 30 or RFID module.

The conductive bosses 32 can be fabricated in any desirable configuration and are not limited to the buss configuration shown in the drawings. For instance, the conventional cylindrical contacts can be substituted for the buss bar configuration.

Consequently, the securement means 14 can be separated from the strap or body portion of the attachment means

12 by disengaging it from the boss 16. The strap or body
portion 18 of the attachment means 12 can be discarded and
the securement means 14 can be sterilized and returned to a
point of use, such as an admittance desk. At the admittance
5 desk, when a patient is admitted, the IC chip 30 can be
loaded with relevant data and associated with the attachment
means 12 by forcing the opening 17 in the attachment means
over the boss 16 of the securement means 14 to bring the
contacts, not shown, of the antenna into engagement with the
10 corresponding contacts 32 of the IC chip or RFID module 30.

Therefore, the continued repeated usage of the
securement means 14 and the IC chip 30 materially reduces
the per-patient cost of the RF identification device 10.
Although the use of an antenna 33 in conjunction with the
15 RFID module 30 has been disclosed, it is to be understood
that a self-contained RFID module can be utilized with said
module incorporating its own antenna, thus eliminating the
necessity for providing an antenna, such as the antenna 33
in the wristband 10.

20 *Sub F14* Other than the conductive means between the
antenna 33 and the chip 30, it is also possible to utilize
the capacitative circuit disclosed in the co-pending
application, Serial No. 60/040,143 filed March 10, 1997,
entitled REACTIVELY COUPLED ELEMENTS IN CIRCUITS ON FLEXIBLE
25 SUBSTRATES. The capacitative circuits of the two embodi-
ments of that application can be applied with equal cogency
to the RF circuit or chip 30.

Furthermore, the antenna 33 can also be incorporated in the securement means 14 if the design parameters of the circuitry permit.

Sub F24

An alternative form of RFID is shown at 40 in Figs. 3 and 4 of the drawings as including an attachment means 42 constituted by an elongated tubular strip or band 44 having an internal chamber 46 provided therein. The construction and mode of operation of the band 44 and the securement means 60 provided for usage therein are disclosed more fully in co-pending application Serial No. 08/787,757, filed January 28, 1997, entitled TUBULAR IDENTIFICATION WRISTBAND, the disclosures of which are incorporated herein by reference.

The securement means 60 is fabricated from a suitable synthetic plastic and has an RFID chip module 62 incorporated therein with a conductive contact or contacts 64 provided on the surface of the securement means 60 for engagement with one or more conductors of an antenna 66 located in the chamber 46 of the band or body 44.

The chip 62 is shown in Fig. 4 of the drawings with the opposite extremities 68 of the body 44 secured on the opposite extremities of the securement means 60.

Sub F24 ~~Where an antenna 66 is used, it is located in one extremity of the chamber 46 and that extremity is marked to indicate the location of the extremity 68 of the band or body 44 which incorporates the antenna. The antenna 66 can also be imprinted or otherwise applied to the wall of the~~

chamber 46, if desired. The chip 62 is located internally of the securement means 60 and has a contact 64 engagable with a corresponding conductor, not shown, on the antenna 66.

5 Therefore, when the securement means 60 and the attachment means 42 are assembled in the manner of Fig. 4, the chip 62 is electrically connected to the antenna 66 and the chip 62 and antenna can serve to receive and transmit signals in response to a suitably designed READER. When the
10 patient is discharged from the hospital, the band or body 44 is disposed of for sanitary reasons and the securement means 60 can be sterilized and reused, thus achieving the economies incident to reuse of the chip 62.

 In an alternative embodiment of the invention, a
15 chip can be inserted in the internal chamber 46 of the tubular strip or band 44 of the attachment means 42. The chip can be associated with the identification card conventionally located in the chamber 46 as shown in the above-referenced application, Serial No. 08/787,757, filed
20 January 28, 1997. In an alternative embodiment, a complete RFID tag with antenna can be incorporated into securement means 60.

 Moreover, it is also possible to incorporate an RFID chip in the pocket of pocket-style wristbands such as
25 that disclosed in U.S. Letters Patent 5,581,924. After the wristband has been utilized, the chip can be removed from the pocket and the wristband discarded. The chip can be

